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# Hanford Chromium Field Study:

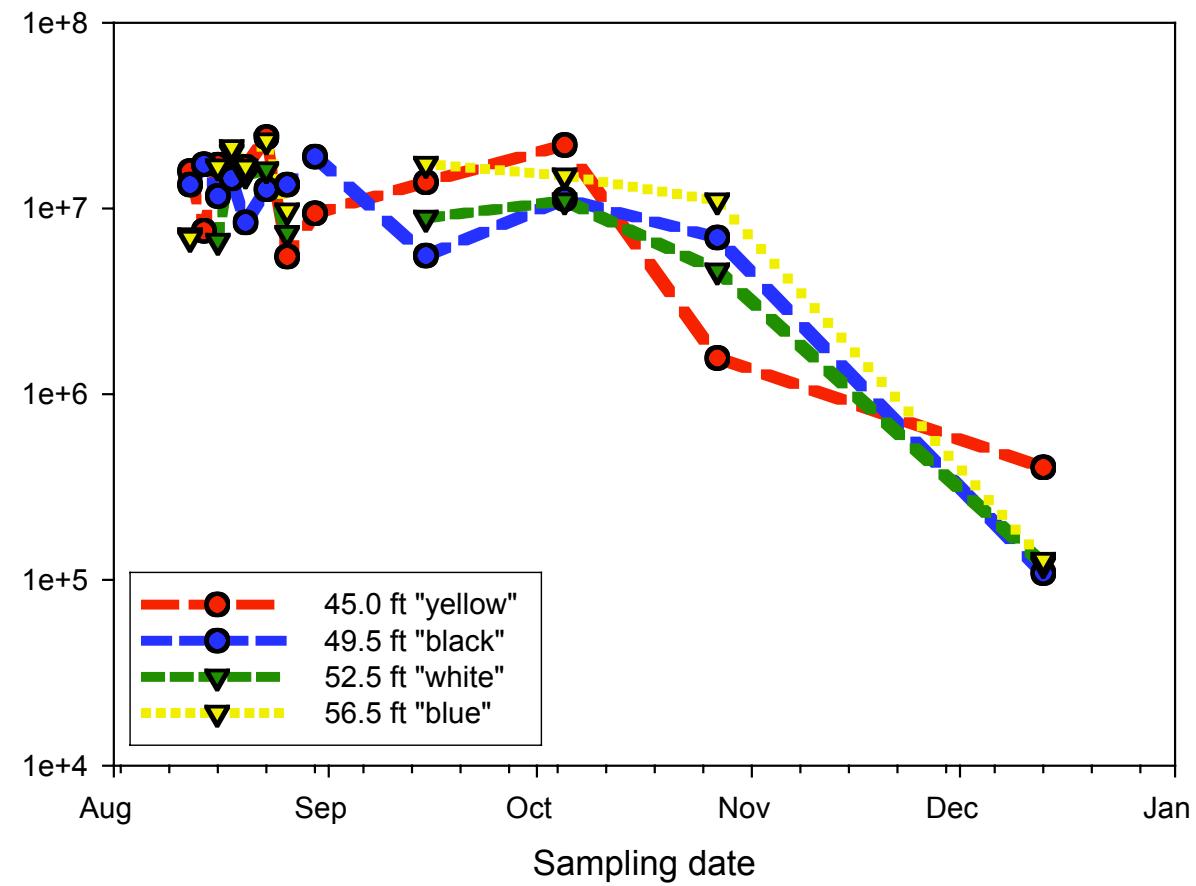
## Microbial analyses to date (March '05)

Eoin Brodie, Sharon Borglin, Dominique Joyner, Gary Andersen, Terry Hazen.

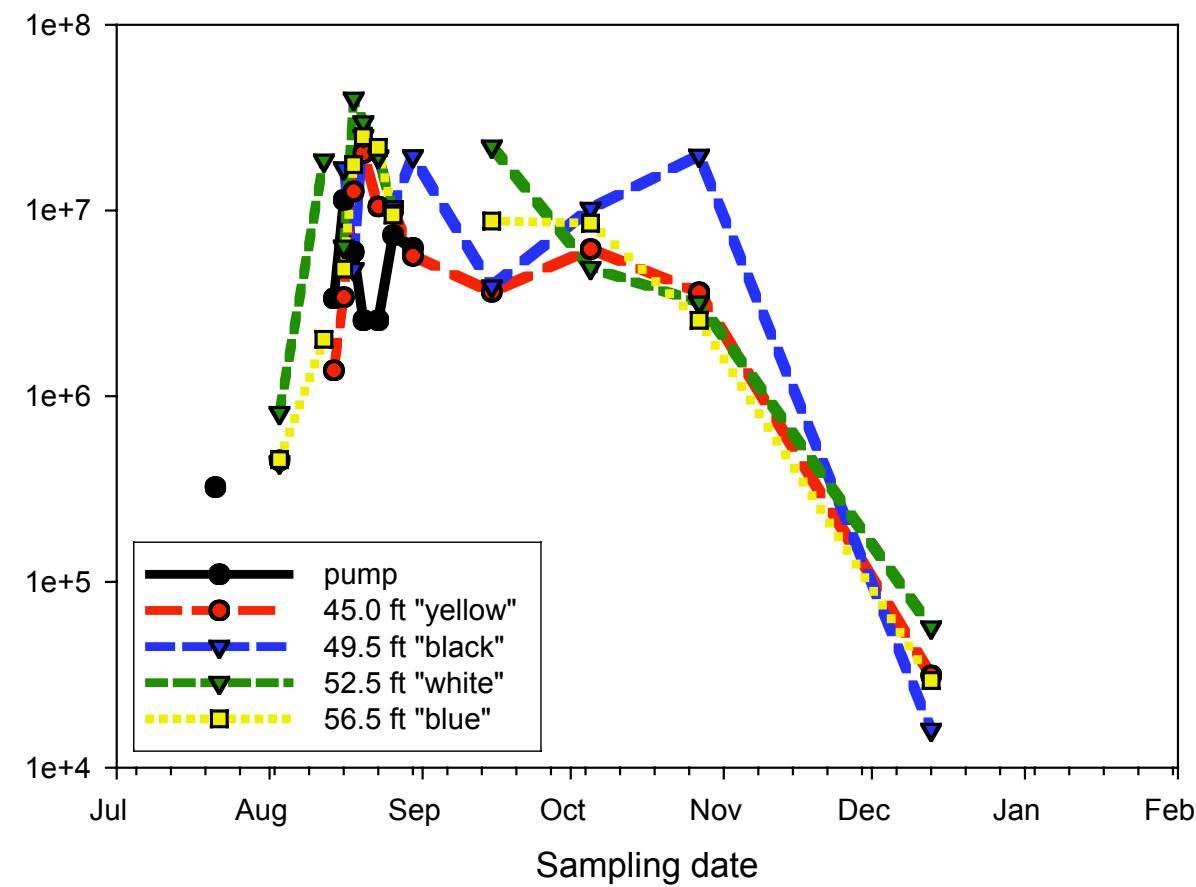
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**Acridine orange direct counts**  
**Molecular analyses**  
**PLFA**  
**16S GeneChip**  
**Clone library**  
**qPCR**

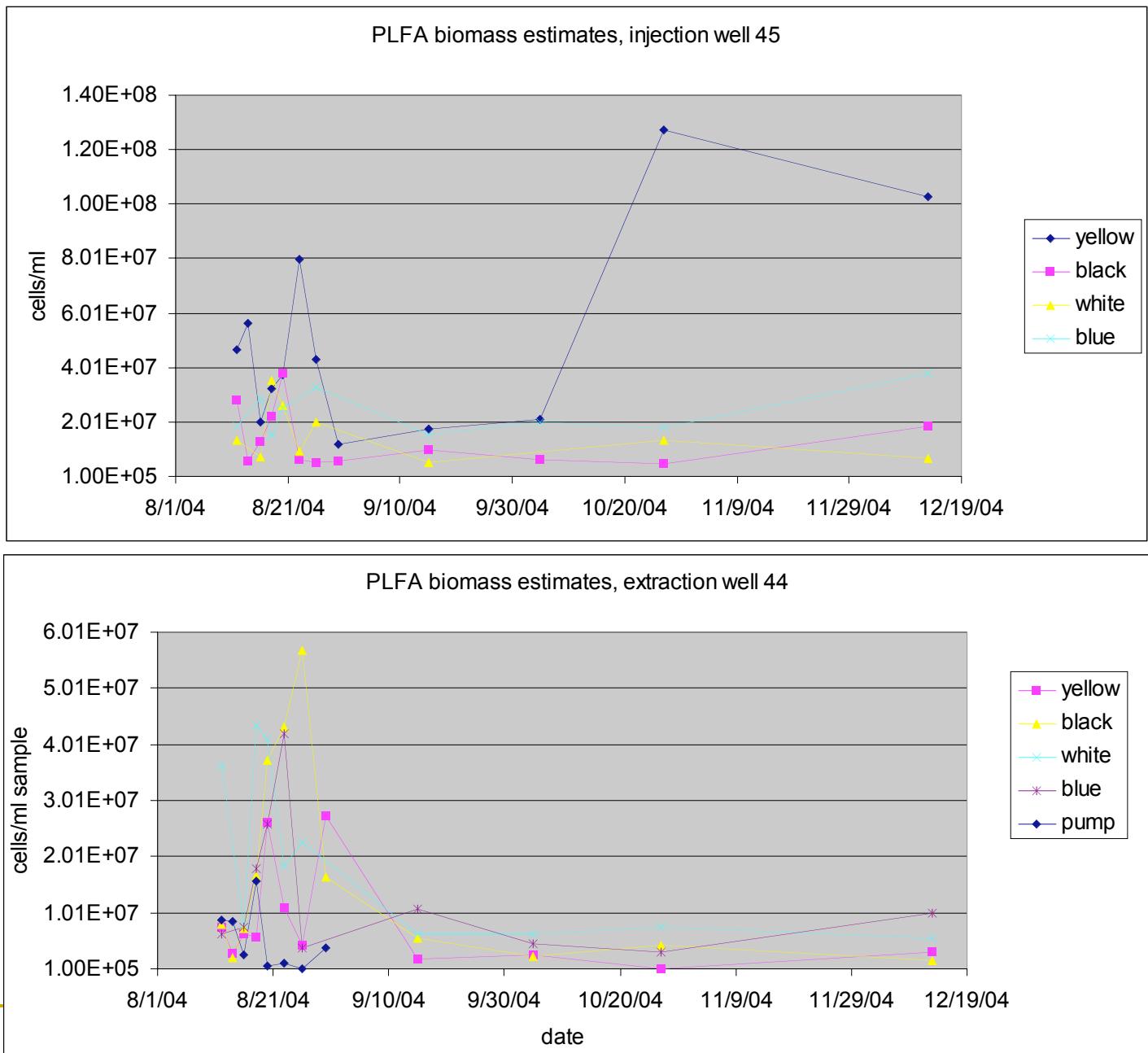
# Acridine orange direct counts: Injection well - 45



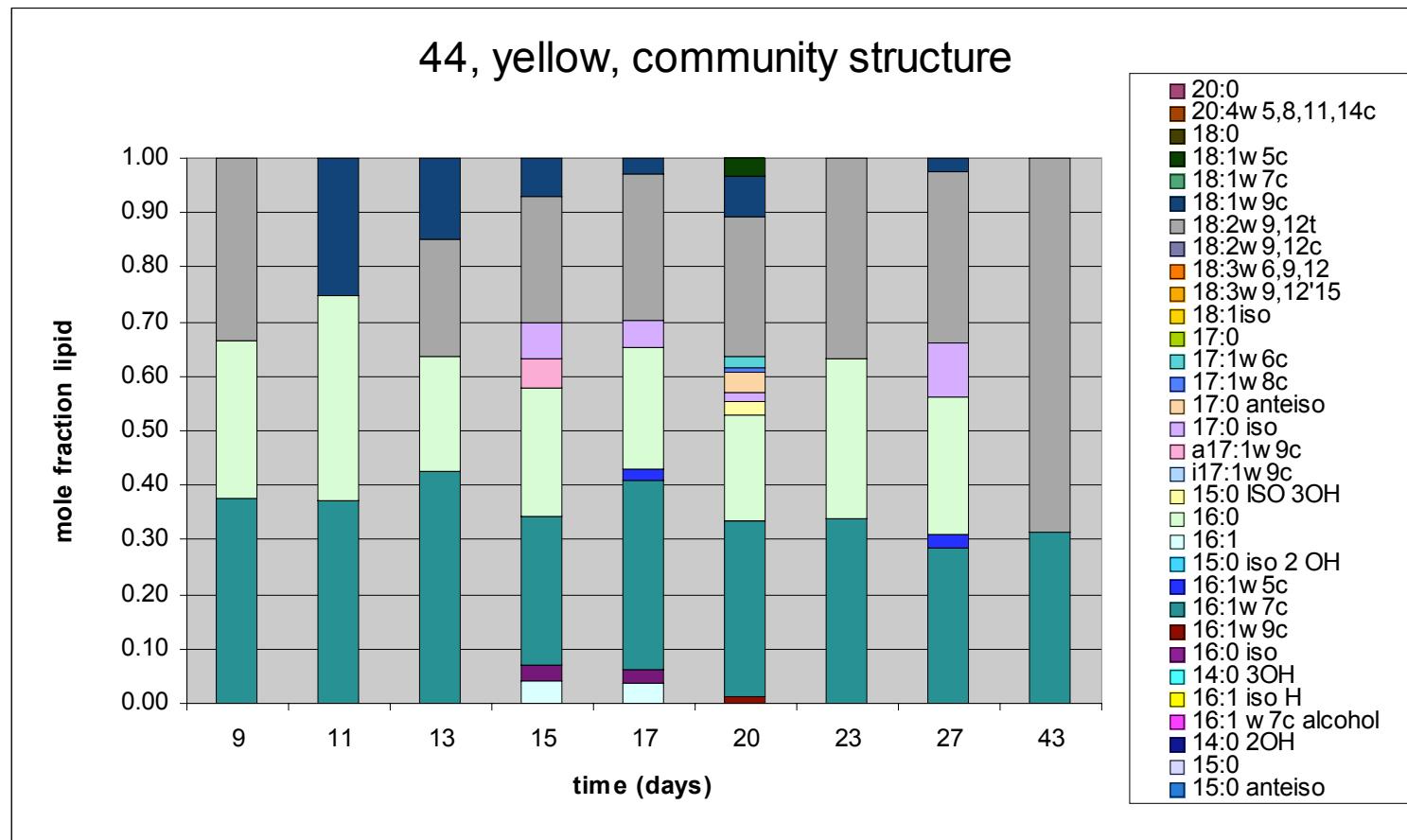
# Acridine orange direct counts: Monitoring well - 44



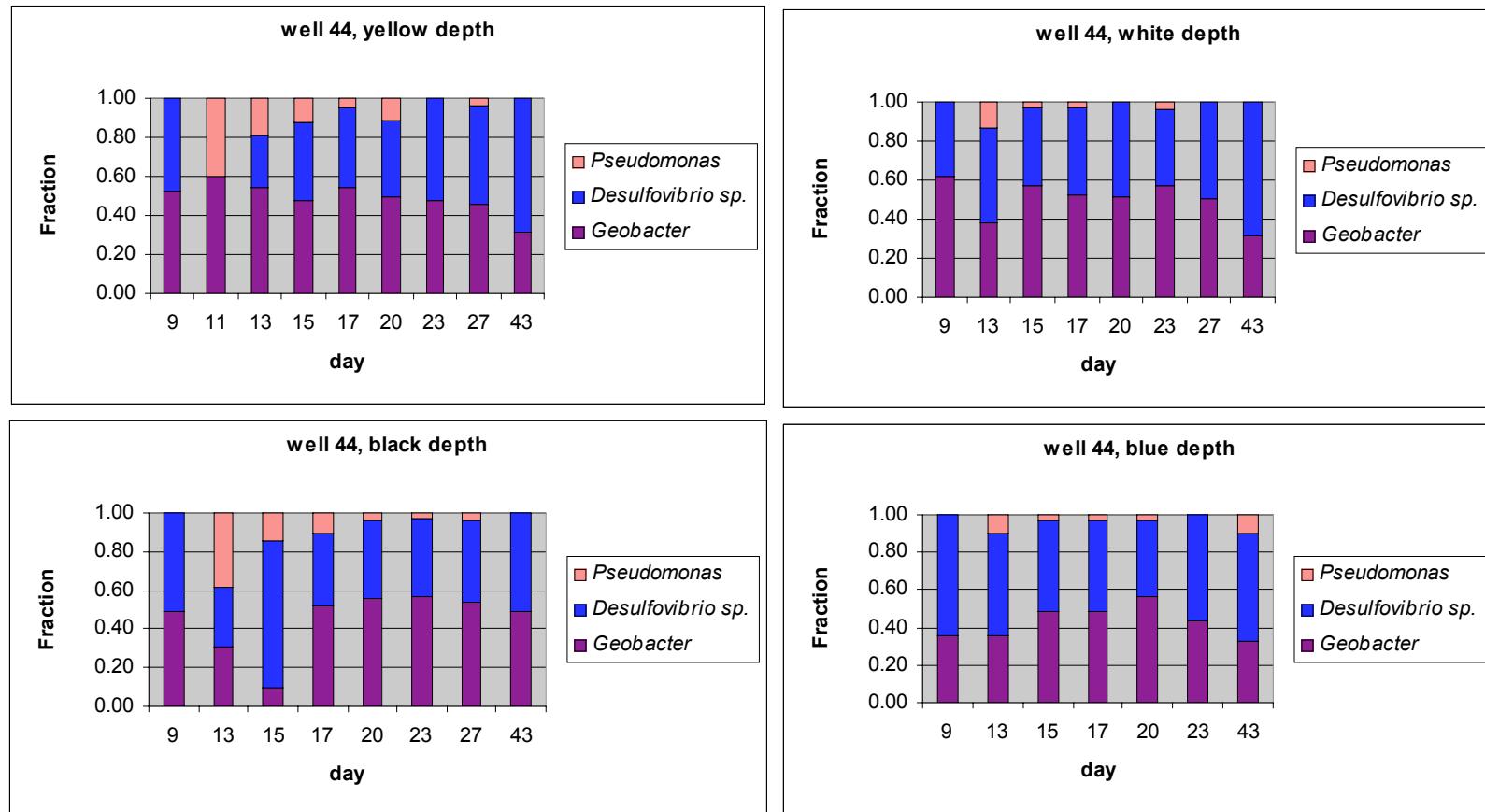
# PLFA biomass estimates



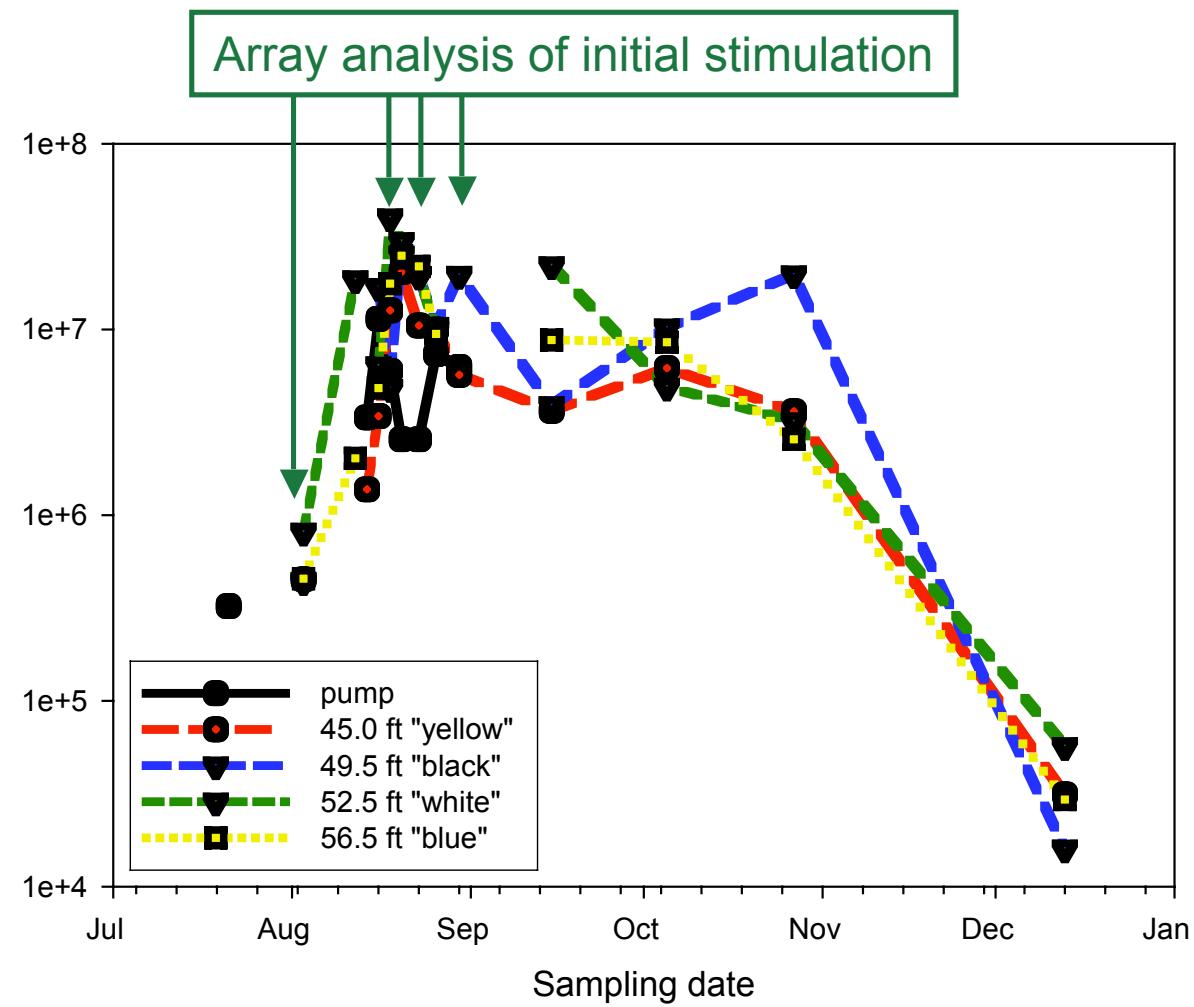
# PLFA: Community structure



# PLFA: Selected Biomarkers



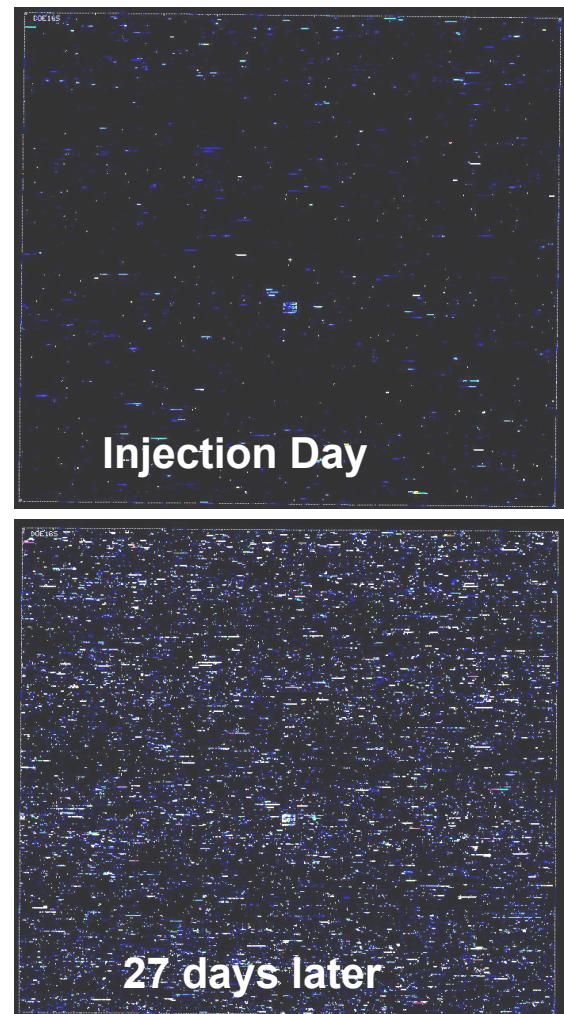
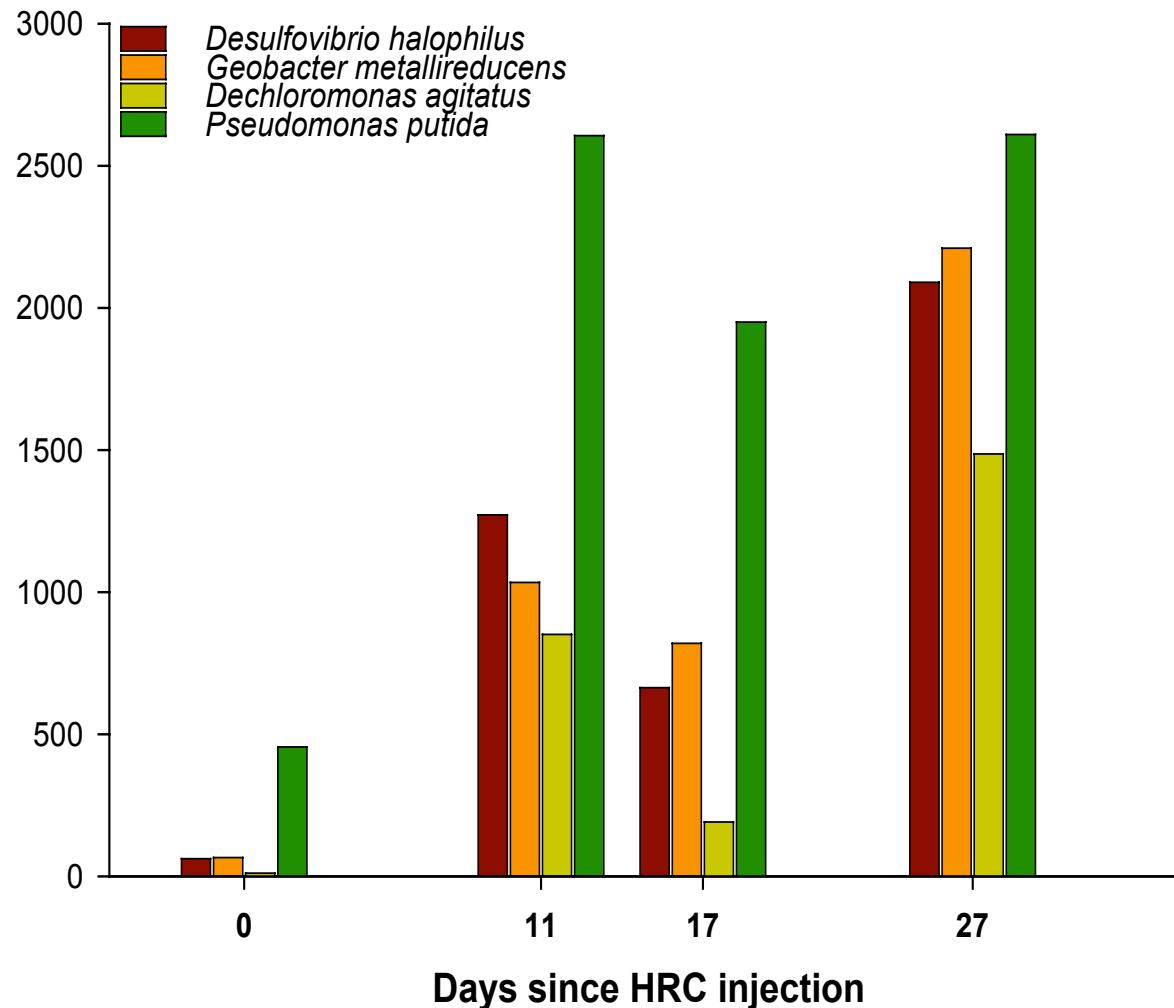
# 16S rDNA analysis



# 16S rDNA GeneChip

## Monitoring well 44 – Initial response

Selected organisms



# 16S rDNA GeneChip

## ■ Archaea

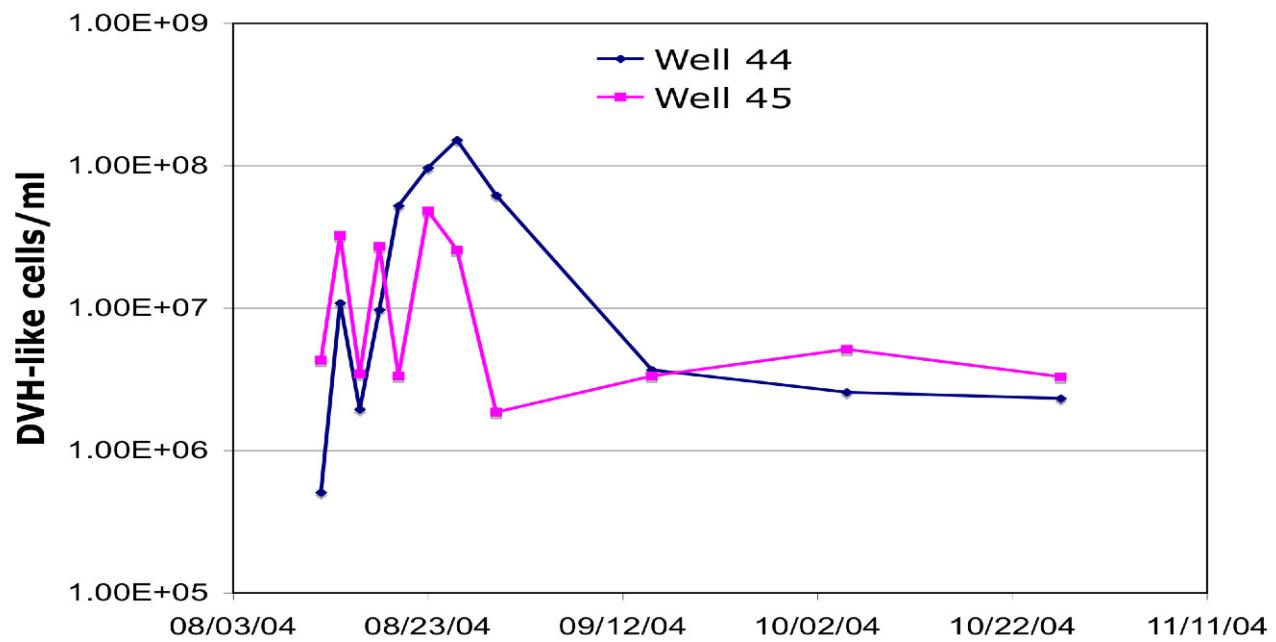
- Only Crenarchaeotes (non-thermophilic) detected
  - Dominated by one type – no cultured relative.

## ■ Bacteria

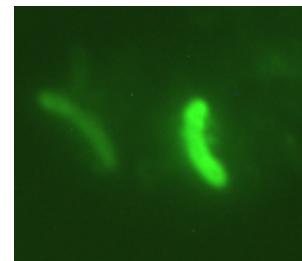
- Initial enrichment of denitrifiers
  - *Fulvimonas, Pseudomonas, Hyphomicrobium, Acidovorax, Aquaspirillum, Thauera, Azoarcus, Comamonas, Dechloromonas, Clostridium.*

- Followed by enrichment of sulfate reducer(s)

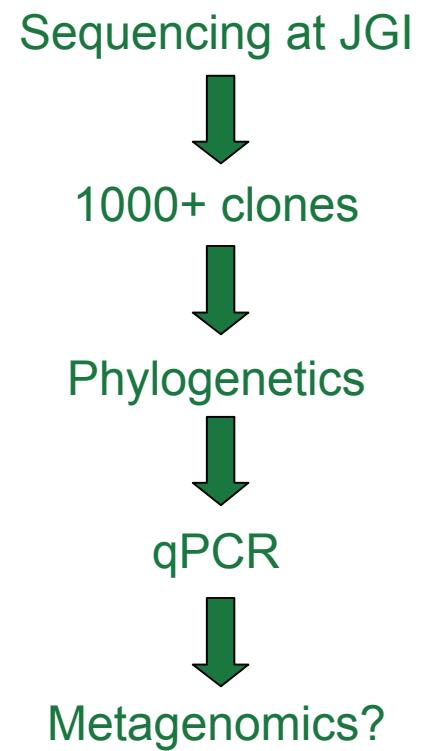
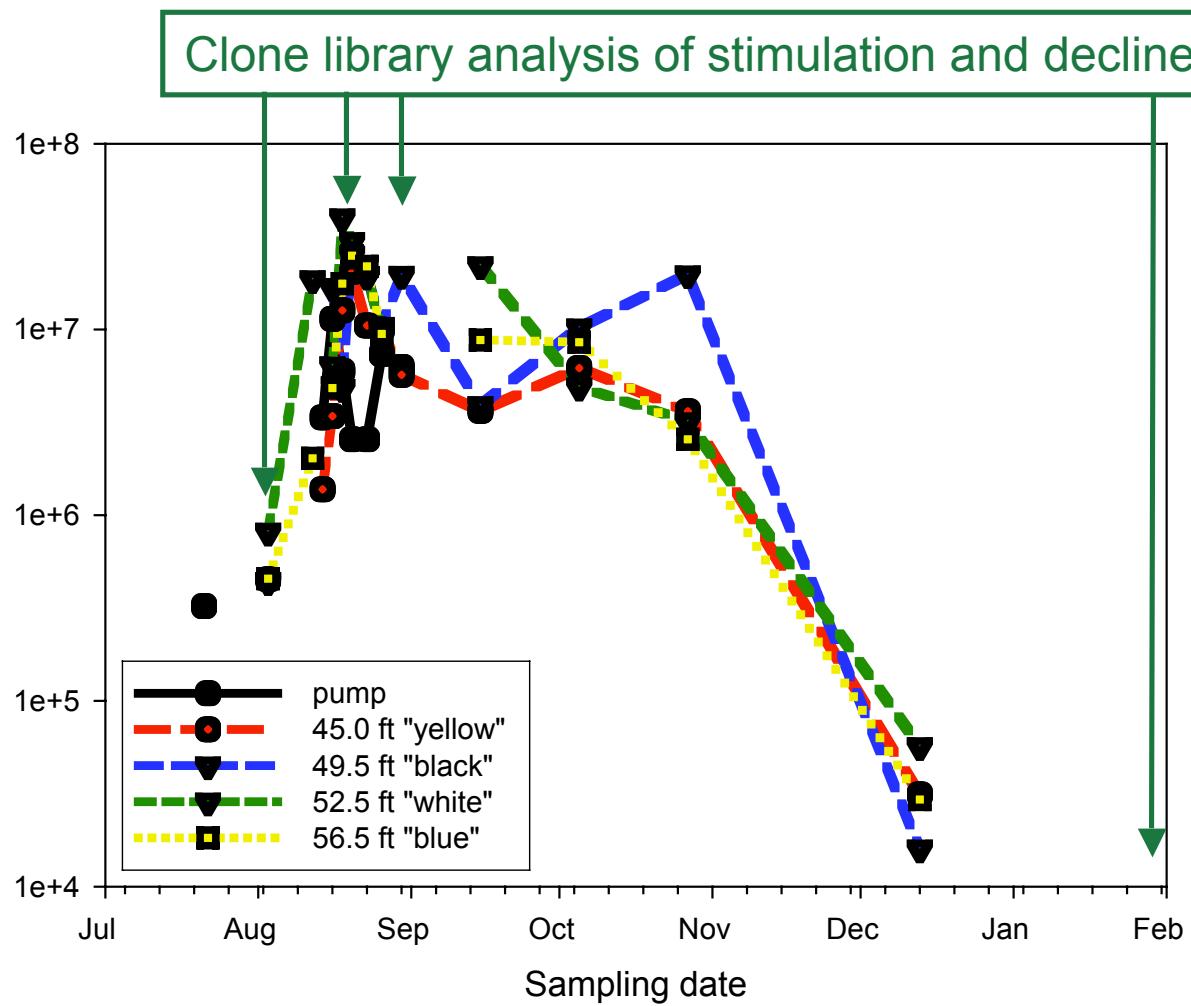
# Direct fluorescent antibody: Desulfovibrio specific detection



*D. vulgaris* (direct  
fluorescent antibody)



# 16S rDNA Clone library & qPCR



# Technological developments

- Direct rRNA analysis by microarray
  - Novel PCR independent analysis of microbial communities
  - Bacteria and Archaea
  - Specific and accurate